NON-PUBLIC?: N
ACCESSION #: 9308110133
LICENSEE EVENT REPORT (LER)

FACILITY NAME: SAN ONOFRE NUCLEAR GENERATING STATION, PAGE: 1 OF 03
UNIT 3

DOCKET NUMBER: 05000362

TITLE: REACTOR TRIP DUE TO A LOSS OF VACUUM
EVENT DATE: 07/05/93 LER #: 93-004-00 REPORT DATE: 08/03/93

OTHER FACILITIES INVOLVED: NONE DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: R. W. Krieger, Vice President TELEPHONE: (714) 368-6255
Nuclear Generation

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On July 5, 1993, at 1943, Unit 3 tripped from 100% power, when the instrument air tubing supplying air to the Main Turbine Gland Seal Steam Spillover Valve Actuator failed. In accordance with the design of the valve, the loss of instrument air pressure to the valve caused the valve to fail open. The resulting loss of turbine gland steam pressure caused a Loss of Vacuum Turbine Trip and Reactor Trip. Emergency Feedwater Actuation occurred as expected due to Low Steam Generator Levels following the Reactor Trip from full power and the Auxiliary Feedwater System operated as designed.

The root cause of the instrument air supply tubing failure was a fatigue induced material failure. Corrective Actions include: 1) replacing the failed Instrument Air tubing, and 2) inspecting the tubing for Unit 2 and

3 Turbine Gland Steam supply and spillover valves.

END OF ABSTRACT

DESCRIPTION OF THE EVENT:

Plant: San Onofre Nuclear Generating Station Unit 3
Reactor Vendor: Combustion Engineering
Event Date: July 5, 1993
Time: 1943
Mode: 1, 100% Power

On July 5, 1993, at approximately 1943 PST, with Unit 3 at 100% power, the Instrument Air tubing LD, TBG! supplying air to the Turbine Gland Seal Steam Spillover Valve TC, PCV) Actuator broke. In accordance with the valve design, the loss of instrument air pressure caused the Turbine Gland Steam Spillover Valve to fail open. The Main Turbine Gland Sealing Steam TC! system consists of two parallel supply valves TC, PCV! from the Main Steam SB! system and one spillover (leakoff) valve. Since the High Pressure Turbine leakoff supplies sufficient sealing steam at full power, the two supply valves are normally fully closed with the spillover valve controlling pressure at approximately 209& open.

The resulting loss of gland steam pressure initiated a Main Turbine Gland Steam TC! Low Pressure alarm at 1943:05. In response to the low gland sealing steam low pressure, Turbine Gland Sealing Steam Supply Valves opened as designed. However, since initial condenser vacuum was already low due to high ocean temperature, the supply valves were unable to restore gland steam pressure fast enough to prevent a turbine trip. At 1943:29, the Turbine TRB, JJ! tripped on low vacuum causing a Reactor RCT! Trip.

Emergency Feedwater Actuation (EFAS) JE! occurred as expected due to Low Steam Generator (SG) SG! Levels following the Reactor Trip from full power and the Auxiliary Feedwater System BA! operated as designed.

CAUSE:

The cause of the low condenser vacuum turbine trip was a loss of instrument air supply pressure to the Main Turbine Gland Steam Spillover Valve. The instrument air pressure was lost when the tubing broke at a compression fitting on the valve actuator.

The apparent failure mode for this event was the instrument air tubing

break caused by a fatigue induced material failure. A Root Cause Evaluation (RCE) of the tubing failure is continuing and if necessary, a revision to this LER will be submitted.

CORRECTIVE ACTIONS:

1. The failed open spillover valve was isolated and the failed instrument air tubing was replaced. The failed tubing was preserved for analysis as part of the RCE.

2. The instrument air tubing for the Unit 3 Turbine Gland Steam Supply Valves was inspected and found to be acceptable for service. The tubing for these valves will be replaced as a precautionary measure during the next refueling outage.

3. The instrument air tubing for the Unit 2 Turbine Gland Steam Supply and Spillover Valves was inspected and has been replaced as a precautionary measure during the current refueling outage.

SAFETY SIGNIFICANCE:

There is no safety significance to this event since all Reactor Protection System (RPS) JC! components performed as designed. There are no reasonable or credible alternative conditions (i.e., power level or operating mode) under which this event would have been more severe.

ADDITIONAL INFORMATION:

During the reactor trip response, Control Room Operators (licensed, utility) noted that the Reactor Trip Override (RTO) circuit had not reduced Main Feedwater Pump (MFP) SJ, P! speed JK! to the desired speed of 3600 RPM. The purpose of the RTO circuit is to reduce MFP speed to 3600 RPM, automatically close Main Feedwater Control Valves SJ, FCV!, and throttle Main Feedwater Bypass Control Valves SJ, FCV! to 5096 open. These actions should result in approximately 5% of rated feedwater flow being delivered to the Steam Generators (SG) for decay heat removal. Thus, SG Levels should be restored following a Reactor Trip without causing any undesired cooldown of the Reactor Coolant System (RCS) AB!. The RTO circuit positioned the valves correctly, but only lowered MFP speed to about 4000 RPM, resulting in a slight additional cooldown of the RCS and corresponding reduction in RCS pressure.

After RCS pressure decreased below 1900 psia, the Shift Superintendent (utility, licensed) properly directed the Control Room Operators to take

manual control of MFP speed and lower the speed. With MFP speed lowered on one pump, RCS temperature, level and pressure were restored to normal conditions for Mode 3.

A new method of calibrating the RTO MFP speed control has been developed. As a result of this shutdown, the MFP RTO speed Electronic Automatic Positioner (EAP) SIK! controller was adjusted prior to startup. The remaining Main Feedwater SJ! controls will be adjusted and tested using this new methodology during the Unit 3 Cycle 7 outage.

Two previous LERs (3-84-008 and 3-87-017, Docket 50-362), reported Turbine/Reactor Trips due to a Loss of Condenser Vacuum. The causes and corrective actions from the previous LERs were unrelated to this event and therefore, could not have prevented the event being reported in this LER (93-004, Docket 50-362).

Southern California Edison Company

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VICE PRESIDENT August 3, 1993 714-368-6255
NUCLEAR GENERATION

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: Docket No. 50-362
30-Day Report
Licensee Event Report No. 93-004
San Onofre Nuclear Generating Station, Unit 3

Pursuant to 10 CFR 50.73(d), this submittal provides the required 30-day written Licensee Event Report (LER) for an occurrence involving a Reactor Trip due to a loss of condenser vacuum. Neither the health nor the safety of plant personnel or the public was affected by this occurrence.

Please advise if you require any additional information.

Sincerely,

Enclosure: LER No. 93-004

cc: B. H. Faulkenberry (Regional Administrator, USNRC Region V)
C. W. Caldwell (USNRC Senior Resident Inspector, Units 1, 2 and 3)
M. B. Fields, NRC Project Manager, San Onofre Units 2 & 3
Institute of Nuclear Power Operations (INPO)

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